

43. FAMILY LEMNACEAE IN THE KASHMIR HIMALAYAS

Lemnaceae, a simple and small family with about 4 genera and 40 species, is cosmopolitan in distribution. It is represented by 3 genera and about 7 species in our area, all aquatic, with extreme modification and reduction in the vegetative thallus. All the species are flowerless throughout their life span, reproducing vigorously by vegetative plates in this area.

Duckweeds as they are also called, are relished as food by herbivorous fish, ducks, geese, swans and other wild fowl. These are collected in large quantities and used as manure or fodder for cattle and pigs. The protein content is rich in amino acids and is regarded as poor peoples food (NAS, 1976). *Wolffia arrhiza* has been used as a vegetable by Burmese, Laotians and the people of Northern Thailand. In Kashmir all the species are fed to cattle and used as chicken feed after semi drying.

KEY TO THE GENERA

- 1. Roots present: thallus disc shaped
 - 2. Roots more than one, in a fascicle..... *Spirodela*
 - 2. Roots never more than one..... *Lemna*
- 1. Roots absent, thallus spherical..... *Wolffia*

SPIRODELA Schleid, Linnaea 13. 391 (1839).
A genus of about 3 species, cosmopolitan, represented by a single species in our area.
Spirodela polyrrhiza (L.) Schleid. In Linnaea 13; 392 (1839); Hegalmair, in Bot. Jb. 21; 284 (1895). *Lemna polyrrhiza* L. Sp. Pl. 970 (1753): Hook. f. Fl. Brit. Ind. 6. 557 (1893).

Easily identified in the field as it is densely matted, free floating 2-6 fronds united, rarely solitary, each frond ovate or rounded, 4-6 mm dia., entire with 4-6 nerves, dark green flat

above, reddish or purplish below. Roots 7-10 arising from the lower surface of each frond, hyaline, root caps 1-1.5 cm long. Locally called *Viout Mangoola*, never flowers in our area. They over winter by producing buds that are dense and sink to the bottom.

Common in lakes, ponds, streams, near marshes and other water sources; Bemna, A. M. Kak 3691; Habak, A. M. Kak 3879; Boulevard, A. M. Kak 3807.

Distribution: Kashmir (India), Asia, Africa, Australia, Europe.

LEMNA L. Sp. Pl. 970 (1753).

A genus with about 15 species. Cosmopolitan. In our area it is represented by the following 3 species (identification of the species is more certain on the fresh material).

KEY TO THE SPECIES

- 1. Thallus elliptic or oblong, submerged, stipitate..... *L. trisulca*
- 1. Thallus oblong or elliptic oblong, free floating not stipitate
 - 2. Ventral surface of the thallus flat or slightly convex never inflated..... *L. minor*
 - 2. Ventral surface of the thallus convex, ventrally inflated..... *L. gibba*

Lemna trisulca L. Sp. Pl. 970 (1753): Hook. Fl. Brit. Ind. 6: 557 (1893).

The species can easily be identified in the field on the basis of the continuous chain like mats on or just below the surface of water, daughter colonies often remain attached to long attenuate stipes. Thallus elliptic, lanceolate or oblanceolate, flat both sides, translucent, greenish yellow, margins slightly wavy or entire, serrate towards apex. Each thallus with or without single root; root caps acutely pointed. Locally called as *Mangoola* it is present in sluggish streams, quiet lakes

and ponds. Not much common as other duck weeds; Leper hospital (Nagin lake) A. M. Kak, 3736; Bemna, A. M. Kak 3906; Boulevard, A. M. Kak 3815.

Distribution: Kashmir (India), Asia, N. America, N. Africa, Australia and Europe.

Lemna gibba L. Sp. Pl. 970 (1753): Hook. l.c. 556.

The species can readily be distinguished in the field by being free floating, solitary or colonial (3-6) plants, oval convex, smooth, greenish yellow from the dorsal surface and globular, inflated hollow, gibbous from the lower surface. Roots singly; root caps blunt. Common in lakes, streams, ponds also in permanent water reservoirs Bemna, A. M. Kak, 3881. Shalten, A. M. Kak, 3816; Mirgund Rukh, A. M. Kak 3905.

Distribution: Cosmopolitan.

Lemna minor L. Sp. Pl. 970 (1753): Hook. f. l.c. 556.

Very common plant, occurs in association with other duck weeds. Fronds in colonies of 3-5, rarely solitary, obovate oblong yellowish green or dark green above, slightly convex ventrally with a single root. Everywhere in ponds, ditches, near artificial water reservoirs, also in the lakes. Shalteng., A. M. Kak 3880; Habak, A. M. Kak, 3814, Nandpora (Nagin) A. M. Kak 3905.

Distribution: Cosmopolitan.

WOLFFIA Horkel ex schleid, in *Linnaea* 13: 389 (1839)

A genus of about 10 species mainly of Tropical and Sub-tropical regions of the world. It is represented by 3 species in our area all aquatic. The members of the *Wolffia* do not produce flowers in our area, and the propagation is purely vegetative. Thallus sometimes bearing masses of red pigment bodies in the epidermal cells.

KEY TO THE SPECIES

1. Thallus more or less globular, loosely cellular, without any papilla
 2. Upper surface round, flat, fronds floating on the surface of water *W. arrhiza*
 2. Upper surface slightly convex, rarely flat, ellipsoid fronds floating just below the surface of water *W. columbiana*
1. Thallus broadly ovoid with a prominent, compactly cellular conical papilla in the centre of dorsal surface *W. papulifera*

Wolffia columbiana Karsten. *Deutsch. Fl. Pharm. med. Bot.* (1880); Fernald, *Gray's Man.* 336 (1949); Kak *et al.* *Ind. Forest.* 104: 4 (1978).

Vigorously multiplying by budding. The thallus is small, free floating, solitary or paired, ellipsoid rarely globular, upper flat portion touching the surface, green on all sides, not conspicuously punctate.

Common in permanent stagnant water, rich in organic debris. Chandmari, Srinagar, Gagribal, near Dal gate, Srinagar in paludal stream. A. M. Kak, 3211, A. M. Kak, 3236.

Distribution: Europe, Tropical America, Himalayas; Kashmir.

Wolffia papulifera Thomps. *Ann. Rept. Indiana Geol. Survey.* 17: 171-191 (1892); Fernald, *Grays. Man.* 386 (1949); Kak, l.c. 104.

Floating or submerged annual herbs. Thallus simple or paired, broadly ovoid, green conspicuously punctate on all sides; dorsal surface flat bearing an outgrowth like papilla in the mid of the thallus. vegetative growth not so vigorous and takes place by the detachment of tiny ovoid green plates.

Common in permanent stagnant waters, Gagribal; A. M. Kak 3940, near Dal gate (Srinagar) A. M. Kak, 3262, A. M. Kak 3275.

Distribution: Europe, America, Kashmir.

Wolffia arrhiza Wimm. *Fl. Schler* 140 (1857); Hook. f. *Fl. Brit. Ind.* 5: 557 (1893).

MISCELLANEOUS NOTES

It can be easily identified in the field as it is the smallest duck weed, 1-1.5 mm dia., hemispherical, green. Roots and other reproductive organs absent.

Rarely present in the ponds, temporary water reservoirs, Rainawari A. M. Kak 3950;

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Nowpora (Khayam) A. M. Kak 3892.

Distribution: Cosmopolitan.

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